6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

[EPA-HQ-OAR-2014-0738; FRL-9945-15-OAR]

Notice of Final Approval for the Operation of a Pressure-Assisted Multi-Point Ground Flare at Occidental Chemical Corporation

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice; final approval.

SUMMARY: This notice announces our approval of the Alternative Means of Emission Limitation (AMEL) request for the operation of a multi-point ground flare (MPGF) at Occidental Chemical Corporation's (OCC) ethylene plant in Ingleside, Texas. This approval notice specifies the operating conditions and monitoring, recordkeeping, and reporting requirements for demonstrating compliance with the AMEL request that this facility must follow. In addition, this notice finalizes a framework that facilities can follow to help expedite and streamline approval of future AMEL requests for pressure-assisted MPGF.

DATES: The AMEL request for the MPGF at OCC's ethylene plant in Ingleside, Texas, is approved and in effect on **[Insert date of publication in the Federal Register]**.

ADDRESSES: The Environmental Protection Agency (EPA) has established a docket for this action under Docket ID No. EPA-HQ-OAR-2014-0738. All documents in the docket are listed on the http://www.regulations.gov Web site. Although listed in the index, some information is not publicly available, e.g., confidential business information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically through http://www.regulations.gov, or in hard copy at the EPA Docket Center, EPA WJC West Building, Room Number 3334, 1301 Constitution Ave., NW, Washington, DC. The Public Reading Room hours of operation are 8:30 a.m. to 4:30 p.m. Eastern Standard Time (EST), Monday through Friday. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Air Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: For questions about this final action, contact Mr. Andrew Bouchard, Sector Policies and Programs Division (E143-01), Office of Air Quality Planning and Standards (OAQPS), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711; telephone number:

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SUPPLEMENTARY INFORMATION:

Acronyms and Abbreviations.

We use multiple acronyms and terms in this notice. While this list may not be exhaustive, to ease the reading of this notice and for reference purposes, the EPA defines the following terms and acronyms here:

AMEL	alternative means of emission limitation
Btu/scf	British thermal units per standard cubic foot
CBI	confidential business information
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
Eqn	equation
FR	**Federal Register**
GC	gas chromatograph
HAP	hazardous air pollutants
LFL	lower flammability limit
LFL_{cz}	combustion zone lower flammability limit
MPGF	multi-point ground flare
NESHAP	national emission standards for hazardous air pollutants
NHV	net heating value
NHV_{cz}	combustion zone net heating value
NSPS	new source performance standards
OAQPS	Office of Air Quality Planning and Standards
OCC	Occidental Chemical Corporation
PS	Performance Specification
QA	quality assurance
QC	quality control
VOC	volatile organic compounds

Organization of This Document. The information in this notice is organized as follows:

I. Background

A. Summary

B. Regulatory Flare Requirements and OCC's AMEL Request

II. Summary of Public Comments on OCC's AMEL Request and the Framework for Streamlining Approval of Future Pressure-Assisted MPGF AMEL Requests

A. OCC's AMEL Request

B. Framework for Streamlining Approval of Future Pressure-Assisted MPGF AMEL Requests

III. Final Notice of Approval of OCC's AMEL Request and Required Operating Conditions

IV. Final Framework for Streamlining Approval of Future Pressure-Assisted MPGF AMEL Requests

I. Background

A. Summary

On August 31, 2015, the EPA published an initial notification in the **Federal Register** (FR) acknowledging receipt of an AMEL approval request for the operation of an MPGF at OCC's ethylene plant in Ingleside, Texas, (see 80 FR 52426, August 31, 2015). This initial notification solicited comment on all aspects of the AMEL request and the resulting alternative operating conditions that are necessary to achieve a reduction in emissions of volatile organic compounds (VOC) and organic hazardous air pollutants (HAP) at least equivalent to the

reduction in emissions required by various standards in 40 CFR parts 60, 61, and 63 that apply to emission sources that would be controlled by these pressure-assisted MPGF. These standards point to the operating requirements for flares in the General Provisions to parts 60 and 63, respectively, to comply with the emission reduction requirements. Because pressure-assisted MPGF cannot meet the velocity requirements in the General Provisions, OCC requested an AMEL. This action provides a summary of the comments received as part of the public review process, our responses to those comments, and our approval of the AMEL request received from OCC for use of a pressure-assisted MPGF at their Ingleside, Texas, ethylene plant, along with the operating conditions they must follow for demonstrating compliance with the AMEL request.

Additionally, the August 31, 2015, FR initial notification also solicited comment on a framework for streamlining future MPGF AMEL requests that we anticipate, when followed, would afford the Agency the ability to review and approve future AMEL requests for MPGF in a more efficient and expeditious manner. This action provides a summary of comments received on the framework as part of the public review process, our responses to those comments, and finalizes a framework for streamlining future pressure-assisted MPGF AMEL requests. We note that future

AMEL requests would still require a notice and an opportunity for the public to comment.

B. Regulatory Flare Requirements and OCC's AMEL Request

OCC submitted an AMEL request to the EPA on December 16, 2014, seeking to operate an MPGF for use during limited high-pressure maintenance, startup, and shutdown events, as well as emergency situations at their ethylene plant in Ingleside, Texas. In their request, OCC cited various regulatory requirements in 40 CFR parts 60, 61, and 63 that will apply to the flare waste gas streams that will be collected and routed to their pressure-assisted MPGF. OCC sought such an AMEL request because their MPGF is not designed to operate below the maximum permitted velocity requirements for flares in the General Provisions of 40 CFR parts 60 and 63. OCC provided information that the MPGF they propose to use will achieve a reduction in emissions at least equivalent to the reduction in emissions for flares complying with these General Provisions requirements (for further background information on the regulatory flare requirements and a facility's ability to request an AMEL, see 80 FR 52427-52428, August 31, 2015).

II. Summary of Public Comments on OCC's AMEL Request and the Framework for Streamlining Approval of Future Pressure-Assisted MPGF AMEL Requests

This section contains a summary of major comments and responses, and rationale for the approved MPGF operating conditions and monitoring, recordkeeping, and reporting requirements necessary to ensure the MPGF will achieve a reduction in emissions of HAP and VOC at least equivalent to the reduction in emissions of other traditional flare systems complying with the requirements in 40 CFR 60.18(b) and 40 CFR 63.11(b). This section also contains a summary of the major comments and responses received on the framework for streamlining approval of future MPGF AMEL requests and our rationale for finalizing this framework.

A. OCC's AMEL Request

Comment: Commenters stated that the LFL_{cz} equation (i.e., Eqn. 2 in Section III below) should be revised so that the calculated LFL_{vg} is expressed in volume percent rather than in volume fraction.

Response: While the equation is mathematically correct with respect to calculating LFL_{vg} in volume fraction, we agree with the commenters that it should be revised to reflect the same units as the compliance metric of LFL_{vg} in volume percent. Since multiplying the volume fraction term by 100 will yield a result in units of volume percent, we have updated Eqn. 2 in Section III to reflect this consistency change.

Comment: Commenters stated that the calibration requirements in Table 2 of Section III of this notice require OCC to monitor net heating value by gas chromatograph (GC) and follow the procedure in Performance Specification (PS) 9 of 40 CFR part 60, appendix B, and that these requirements require a daily mid-level calibration check and that the EPA should change them from a daily basis to a weekly basis. Commenters stated that a weekly calibration should be allowed because operating conditions in Table 2 in Section III (1)(f) of this notice only allow the time needed to perform a daily calibration, along with other maintenance periods and instrument adjustments, to not exceed 5 percent and that a daily calibration will lead to a built-in loss of monitor downtime of almost 5 percent since it requires 1 hour in a 24-hour day (e.g., 4.2 percent of the time). Commenters also requested that this monitor downtime should be calculated on a rolling 12-month basis for compliance purposes and that the EPA clarify that the calibration and maintenance procedures conducted when the flare is not receiving regulated material be excluded from the monitor downtime calculation.

Response: The requirement to perform a daily mid-level calibration check for a GC is codified in the procedure of PS 9 of 40 CFR part 60, appendix B, and Table 2 of Section III in

this notice already provides some relief with respect to the amount of analysis needed (i.e., a single daily mid-level calibration check can be used (rather than triplicate analysis)) for the calibration checks on a GC. The AMEL does not require monitoring with a GC, but rather allows for the use of either a GC or a calorimeter to demonstrate compliance with the monitoring and operating requirements. Given that OCC's MPGF will handle both planned maintenance, startup and shutdown events as well as potential emergency situations, a monitoring system used to demonstrate compliance for this AMEL must be capable of producing a reliable result instantaneously, and the more frequent (i.e., daily) calibrations required in PS 9 provides a high level of assurance that the GC reading will be both precise and accurate. Thus, we are not changing the requirement within PS 9 to allow less frequent (i.e., weekly) calibration checks for a GC. We do understand that monitoring equipment can break down or need maintenance from time to time to continue to perform reliably. Therefore, to provide flexibility that ensures the GC is maintained properly, we are clarifying that calibration and maintenance procedures conducted when the flare is not receiving regulated material are excluded from the monitor downtime calculation. Also, we are clarifying that monitor downtime to perform calibration and maintenance

procedures may not exceed 5 percent of the time when the flare is receiving regulated material, calculated on an annual, non-rolling average basis as OCC further clarified in their comments on the AMEL request during a conference call with the EPA (see memorandum, "Meeting Record for January 12, 2016, Meeting Between the U.S. EPA and Occidental Chemical Corporation," at Docket ID No. EPA-HQ-OAR-2014-0738).

Comment: Commenters stated that the EPA should include a provision in the final AMEL to allow a small percentage of downtime (i.e., 5 percent of the time the flare is receiving regulated material) for video camera maintenance and repair/replacement. One commenter asked for the EPA to add language to clarify that the video camera requirement for monitoring visible emissions applies only when the flare is receiving regulated material.

Response: Given that the MPGFs approved in earlier AMELs, as well as OCC's MPGF, are all back-up control devices, we are clarifying that the video camera requirement for monitoring visible emissions applies only when the flare is receiving regulated material. Furthermore, while we realize that MPGFs have sufficiently tall fences built around them primarily for safety, their design does pose a potential challenge with respect to allowing a person on the ground to monitor the MPGFs

for visible emissions. Given that the AMEL requests we have approved to date from The Dow Chemical Company (Dow) and ExxonMobil Chemical Company (ExxonMobil) (see 80 FR 52426, August 31, 2015), as well as this AMEL approved for OCC, all allow for permitted use of MPGF only in cases of maintenance, startup, shutdown, and emergency situations and not on a continuous basis, the time when the MPGF is not in operation should be sufficient for video camera maintenance and repair/replacement to occur. Therefore, we are not including a provision to allow any downtime for video camera maintenance and repair/replacement when the MPGF is receiving regulated material.

Comment: A few commenters suggested that the EPA clarify the language in the referenced operating conditions in Section III (2) of this notice which states: "Each stage of MPGF burners must have at least two pilots with a continuously lit pilot flame." Specifically, commenters requested that the EPA clarify that while each stage of the MPGF is equipped with a minimum of two pilots, that only one continuously lit pilot flame is needed when the stage is in operation.

Response: We disagree that it is necessary to change the operating conditions language in Section III (2) as suggested by the commenters, and we believe the requirements for the OCC AMEL

approval should be consistent with the previous AMEL operating conditions published for both Dow and ExxonMobil (see 80 FR 52426, August 31, 2015). The operating conditions in Section III (2) and reporting requirements in Section III (6) of this notice are clear that the MPGF system should be equipped with a minimum of two pilots per stage and that a flame must be present at all times the stage is in use and burning regulated material. In addition, a complete loss of pilot flame for more than 1 minute in a 15-minute period is an excess emission that must be reported.

Comment: One commenter requested that the EPA clarify the language with respect to requiring "records" in the excess emissions reporting requirements and suggested replacing the term with "periods."

Response: We disagree with changing the terminology "records" to "periods" in the excess emissions reporting requirements. Section III (6)(c) of the operating conditions below are clear that we are not requiring reporting of all records that an owner or operator may keep or that they may be required to keep as a condition of AMEL approval for a given MPGF, but rather, that the owner or operator must report the specific information in the excess emissions report.

B. Framework for Streamlining Approval of Future Pressure-Assisted MPGF AMEL Requests

Comment: One commenter stated that the framework for streamlining approval of future MPGF AMEL requests should not require information unrelated to a burner equivalency determination, information that has already been submitted to other parts of the Agency for permitting purposes, or proprietary MPGF burner design information. Specifically, the commenter stated that the EPA should remove the following information from the framework that owners or operators seeking approval of an MPGF AMEL are required to submit:

- Details of the overall emissions control scheme: Section IV (1)(b).
- MPGF capacity and operation (including number of rows (stages), number of burners and pilots per stage and staging curve): Section IV (1)(b).
- MPGF burner size and design: Section IV (1)(c) and (1)(d).
- Cross-light testing: Section IV (5) in its entirety.
- Flaring reduction considerations: Section IV (6)(a).

Another commenter stated that at Section IV (3)(a)(ii), for an engineering evaluation demonstration, once a burner of a specific type, size, and geometry has been tested on a waste

gas, that burner can be considered to be proven stable and smokeless for that waste gas only. Further, the commenter states that engineering assessment and extrapolation should only be permitted under the framework where burner design and waste gas are the same as tested because any deviation in burner design or waste gas could lead to significant changes in stability or smokeless capacity.

Response: First, we note that the objective of the framework is to provide the regulated community with a clear and concise understanding of the minimum information that must be provided to the Agency so that we can adequately evaluate an MPGF AMEL request. The information listed in the framework is necessary to evaluate whether an MPGF operates properly and controls emissions of regulated material at least equivalent to applicable regulations. Hence, information related to details of the overall emissions control scheme, MPGF capacity, operation and burner size, cross-light testing, and flaring reduction considerations are all important and necessary information to adequately make an equivalency determination. Therefore, we are not removing them from the framework.

Second, with respect to submitting information that may have been developed and submitted already for permitting purposes, we note that this framework is designed to help

streamline and expedite future approvals of MPGF AMEL requests. If an owner or operator does not submit the information set forth in the framework, additional time and resources will have to be spent to evaluate the AMEL request.

Lastly, with respect to concerns about MPGF burner design and the potential for some of the information to be proprietary (e.g., geometry, tip drillings, and hole size), we note that the MPGF burner tests conducted to date indicate that flare head design (along with waste gas composition) can influence flame stability, which is one of the more important factors affecting performance of the MPGF that the Agency must consider in whether to approve an AMEL request and agree with the commenter that flare stability is affected by burner design/waste gas combination tested (see 80 FR 8023, February 13, 2015, for more details). To the extent the owner, operator or flare vendor/manufacturer considers this information to be CBI, they should note that in their MPGF AMEL request, and we will provide details on our CBI policy and procedures on how they should submit this information to the Agency after the AMEL request has been received. At a minimum, facilities should note the flare vendor and burner model name.

Comment: One commenter recommended that the framework allow flare vendors/manufacturers and owners or operators to determine

and document the most appropriate burner testing durations (e.g., 5-minute screening test to determine flameout followed by three 15-minute tests at other more stable points). Another commenter suggested that for the sole purpose of flame stability evaluation, 3 to 5 minutes is sufficient for a testing duration.

One commenter suggested that the specific requirements of the flare flame stability tests be enumerated in Section IV (4)(b) below since it references back to performance test information in Section IV (3)(a)(i).

Response: After consideration of the comments received during the comment period as well as the supplemental technical information received after the close of the comment period (see memorandum, "Meeting Record for January 7, 2016, Meeting Between the U.S. EPA and Zeeco," at Docket ID No. EPA-HQ-OAR-2014-0738), we agree with the commenters that the duration of the MPGF stability test runs in Section IV (4)(c) can be shortened from 15 minutes, but disagree with the commenters that we should allow flare vendors/manufacturers and owners or operators to determine and document the most appropriate burner testing durations. In reviewing the available test data on an MPGF where unstable test runs with constant conditions were observed, a few runs were aborted in 4 minutes or less due to instability (see memorandum, "Review of Available Test Data on Multipoint Ground

Flares," at Docket ID No. EPA-HQ-OAR-2014-0738-0002). The commenters have suggested that the instability was related to the changing and decreasing heat content and composition of the fuel gas stream as the fuel gas mixture was being produced for the trial flare run. If the demonstration had instead relied upon a constant gas mixture that could have been produced in a mix tank, rather than an online mixer, than the demonstration of stability could have been done over a shorter duration. In addition, when correlating back the MPGF stability testing duration to the averaging time for a monitoring system like a GC that can be used to demonstrate compliance with the operating conditions laid out in Section III below, the total testing time of the three runs should tie back to the time it takes for one GC analysis cycle to occur (e.g., 15 minutes in duration). Therefore, based on these reasons, as well as in order to minimize emissions from the MPGF stability testing requirements, we are finalizing in Section IV (4)(c) that the duration of each individual MPGF stability test run must be a minimum of 5 minutes in duration rather than the longer period of 15 minutes in duration that was in the initial framework.

Regarding the comment to enumerate the performance test information in Section IV (4)(b) rather than cross-referencing

to Section IV (3)(a)(i), we disagree that the change is necessary.

Comment: One commenter stated that in lieu of using a generic olefin gas or an olefinic gas mixture for purposes of the destruction efficiency/combustion efficiency performance demonstration specified in the framework, the framework should require the performance test to be based only on waste gas representative of the proposed flaring application, in conjunction with the specific burner type proposed for use.

Response: As discussed in Section IV (3)(a), the framework provides the owner or operator with the option to test the MPGF using a representative waste gas or a waste gas, such as an olefin gas or olefinic gas mixture, that will challenge the performance and smokeless capacity of the MPGF. Since MPGF testing is occurring prior to plant construction and startup, sufficient representative waste gas may not be available to satisfy the testing requirements specified. Therefore, we allow olefin gas or olefinic gas mixtures to be considered since they represent the olefins industry where the MPGF installations are being used and since they have been shown to challenge MPGF performance. For this reason, we disagree with the commenter that we should amend this requirement in the framework.

Comment: A few commenters suggested that the EPA allow the AMEL framework to provide approval for alternate proposed combustion parameters or on-line monitoring requirements and technology.

One commenter suggested that the framework should provide success criteria for submittal and that a clear articulation of the criteria the Agency will use to promptly approve an AMEL request is needed.

Response: As laid out in Section IV (7) below, sources should consider all the information laid out in their AMEL application and make recommendations on the type of monitoring and operating conditions necessary for the MPGF to demonstrate equivalent reductions in emissions as compared to flares complying with the requirements at 40 CFR 60.18 and 40 CFR 63.11. Additionally, we note that while the framework should provide the regulated community a blueprint for the minimum information the Agency needs to review and eventually finalize an MPGF AMEL request, the Clean Air Act requires us to provide the public with notice and opportunity to comment on the AMEL (see 80 FR 8023, February 13, 2015, and 80 FR 52426, August 31, 2015, for more details) and consider this input before any AMEL request can be formally finalized. Because of this statutory requirement, we cannot provide any additional language for the

regulated community with respect to promptly approving an AMEL request without first considering public comments regardless of whether or not all the information submitted to the Agency exactly follows the framework in Section IV below.

Comment: One commenter suggested that the framework should specify that cross-light testing is only required when every burner in the MPGF does not have a continuous pilot.

Another commenter agreed with the cross-light testing specified in the framework.

Response: An MPGF can have hundreds of burners and, when seeking an approval of an AMEL request, the owner or operator must demonstrate that the system can be operated with a flame present at all times when regulated material is routed to the flare and that the burners will light and combust this regulated material. To date, the AMEL requests for MPGF systems we have approved indicate that cross lighting will be used to light the vast majority of individual burners within a given stage, which is why this testing requirement is specified in the framework. If a future MPGF design will not use cross lighting, the owner or operator must demonstrate through testing how the burners within a stage will be lit to combust regulated material. Because this would be a different design from the MPGF that informed our development of the framework, different

requirements from those specified in Section IV (5) below for the pilot flames and pilot monitoring systems may be required for such an MPGF system and these should be conveyed in the AMEL request.

Comment: One commenter suggested that a mechanism similar to the "Framework for Streamlining Approval for Future Pressure-Assisted MPGF AMEL" should also be made available for elevated flares that use pressure-assisted burners.

Response: While we understand the commenter's suggestion that the Agency clearly prescribe a path forward for evaluating non-MPGF pressure-assisted flare designs that may not be able to comply with the flare requirements of 40 CFR 60.18(b) or 40 CFR 63.11(b), this request is beyond the scope of both OCC's MPGF AMEL request and the framework for pressure-assisted MPGF.

III. Final Notice of Approval of OCC's AMEL Request and Required Operating Conditions

Based on information the EPA received from OCC and the comments received through the public comment period, we are approving OCC's request for an AMEL and establishing operating requirements for the pressure-assisted MPGF at OCC's Ingleside, Texas, ethylene plant. The operating conditions for OCC's MPGF that will achieve a reduction in emissions at least equivalent to the reduction in emissions being controlled by a steam-

assisted, air-assisted, or non-assisted flare complying with the requirements of either 40 CFR 63.11(b) or 40 CFR 60.18(b) are as follows:

(1) The MPGF system must be designed and operated such that the combustion zone gas net heating value (NHV_{cz}) is greater than or equal to 800 British thermal units per standard cubic foot (Btu/scf) or the combustion zone gas lower flammability limit (LFL_{cz}) is less than or equal to 6.5 percent by volume. Owners or operators must demonstrate compliance with the NHV_{cz} or LFL_{cz} metric by continuously complying with a 15-minute block average. Owners or operators must calculate and monitor for the NHV_{cz} or LFL_{cz} according to the following:

(a) Calculation of NHV_{cz}

(i) The owner or operator shall determine NHV_{cz} from compositional analysis data by using the following equation:

$$NHV_{vg} = \sum_{i=1}^{n} x_i NHV_i \qquad \text{(Eqn. 1)}$$

where:

NHV_{vg} = Net heating value of flare vent gas, Btu/scf.

Flare vent gas means all gas found just prior to the MPGF. This gas includes all flare waste gas (i.e., gas from facility operations that is directed to a flare

for the purpose of disposing of the gas), flare sweep gas, flare purge gas and flare supplemental gas, but does not include pilot gas.

i = Individual component in flare vent gas.

n = Number of components in flare vent gas.

x_i = Concentration of component i in flare vent gas, volume fraction.

NHV_i = Net heating value of component i determined as the heat of combustion where the net enthalpy per mole of offgas is based on combustion at 25 degrees Celsius (°C) and 1 atmosphere (or constant pressure) with water in the gaseous state from values published in the literature, and then the values converted to a volumetric basis using 20 °C for "standard temperature." Table 1 summarizes component properties including net heating values.

(ii) For MPGF, $NHV_{vg} = NHV_{cz}$.

(b) Calculation of LFL_{cz}

(i) The owner or operator shall determine LFL_{cz} from compositional analysis data by using the following equation:

$$LFL_{vg} = \frac{1}{\sum_{i=1}^{n}\left(\frac{\chi_i}{LFL_i}\right)} \times 100\% \quad \text{(Eqn. 2)}$$

where:

LFL_{vg} = Lower flammability limit of flare vent gas, volume percent (vol %).

n = Number of components in the vent gas.

i = Individual component in the vent gas.

χ_i = Concentration of component i in the vent gas, vol %.

LFL_i = Lower flammability limit of component i as determined using values published by the U.S. Bureau of Mines (Zabetakis, 1965), vol %. All inerts, including nitrogen, are assumed to have an infinite LFL (*e.g.*, $LFL_{N2} = \infty$, so that $\chi_{N2}/ LFL_{N2} = 0$). LFL values for common flare vent gas components are provided in Table 1.

(ii) For MPGF, $LFL_{vg} = LFL_{cz}$.

(c) The operator of an MPGF system shall install, operate, calibrate, and maintain a monitoring system capable of continuously measuring flare vent gas flow rate.

(d) The operator shall install, operate, calibrate, and maintain a monitoring system capable of continuously measuring

(i.e., at least once every 15 minutes), calculating, and recording the individual component concentrations present in the flare vent gas or the owner or operator shall install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording NHV_{vg}.

(e) For each measurement produced by the monitoring system, the operator shall determine the 15-minute block average as the arithmetic average of all measurements made by the monitoring system within the 15-minute period.

(f) The operator must follow the calibration and maintenance procedures according to Table 2. Maintenance periods, instrument adjustments, or checks to maintain precision and accuracy and zero and span adjustments may not exceed 5 percent of the time the flare is receiving regulated material.

Table 1 — Individual Component Properties

Component	Molecular Formula	MW_i (pounds per pound-mole)	NHV_i (British thermal units per standard cubic foot)	LFL_i (volume %)
Acetylene	C_2H_2	26.04	1,404	2.5
Benzene	C_6H_6	78.11	3,591	1.3
1,2-Butadiene	C_4H_6	54.09	2,794	2.0
1,3-Butadiene	C_4H_6	54.09	2,690	2.0
iso-Butane	C_4H_{10}	58.12	2,957	1.8
n-Butane	C_4H_{10}	58.12	2,968	1.8
cis-Butene	C_4H_8	56.11	2,830	1.6

Component	Molecular Formula	MW_i (pounds per pound-mole)	NHV_i (British thermal units per standard cubic foot)	LFL_i (volume %)
iso-Butene	C_4H_8	56.11	2,928	1.8
trans-Butene	C_4H_8	56.11	2,826	1.7
Carbon Dioxide	CO_2	44.01	0	∞
Carbon Monoxide	CO	28.01	316	12.5
Cyclopropane	C_3H_6	42.08	2,185	2.4
Ethane	C_2H_6	30.07	1,595	3.0
Ethylene	C_2H_4	28.05	1,477	2.7
Hydrogen	H_2	2.02	274	4.0
Hydrogen Sulfide	H_2S	34.08	587	4.0
Methane	CH_4	16.04	896	5.0
Methyl-Acetylene	C_3H_4	40.06	2,088	1.7
Nitrogen	N_2	28.01	0	∞
Oxygen	O_2	32.00	0	∞
Pentane+ (C5+)	C_5H_{12}	72.15	3,655	1.4
Propadiene	C_3H_4	40.06	2,066	2.16
Propane	C_3H_8	44.10	2,281	2.1
Propylene	C_3H_6	42.08	2,150	2.4
Water	H_2O	18.02	0	∞

Table 2 — Accuracy and Calibration Requirements

Parameter	Accuracy requirements	Calibration requirements
Flare Vent Gas Flow Rate	±20 percent of flow rate at velocities ranging from 0.1 to 1 foot per second. ±5 percent of flow rate at velocities greater than 1 foot per second.	Performance evaluation biennially (every 2 years) and following any period of more than 24 hours throughout which the flow rate exceeded the maximum rated flow rate of the sensor, or the data recorder was

		off scale. Checks of all mechanical connections for leakage monthly. Visual inspections and checks of system operation every 3 months, unless the system has a redundant flow sensor. Select a representative measurement location where swirling flow or abnormal velocity distributions due to upstream and downstream disturbances at the point of measurement are minimized.
Pressure	±5 percent over the normal range measured or 0.12 kilopascals (0.5 inches of water column), whichever is greater.	Review pressure sensor readings at least once a week for straight-line (unchanging) pressure and perform corrective action to ensure proper pressure sensor operation if blockage is indicated. Performance evaluation annually and following any period of more than 24 hours throughout which the pressure exceeded the maximum rated pressure of the sensor, or the data recorder was off scale. Checks of all mechanical connections for leakage monthly. Visual inspection of all components for integrity, oxidation and galvanic corrosion every 3 months, unless the system has a redundant

		pressure sensor. Select a representative measurement location that minimizes or eliminates pulsating pressure, vibration, and internal and external corrosion.
Net Heating Value by Calorimeter	±2 percent of span	Calibration requirements should follow manufacturer's recommendations at a minimum. Temperature control (heated and/or cooled as necessary) the sampling system to ensure proper year-round operation. Where feasible, select a sampling location at least 2 equivalent diameters downstream from and 0.5 equivalent diameters upstream from the nearest disturbance. Select the sampling location at least 2 equivalent duct diameters from the nearest control device, point of pollutant generation, air in-leakages, or other point at which a change in the pollutant concentration or emission rate occurs.
Net Heating Value by Gas Chromatograph	As specified in PS 9 of 40 CFR part 60, appendix B.	Follow the procedure in PS 9 of 40 CFR part 60, appendix B, except that a single daily mid-level calibration check can be used (rather than triplicate analysis), the multi-point calibration can be

		conducted quarterly (rather than monthly), and the sampling line temperature must be maintained at a minimum temperature of 60 °C (rather than 120 °C).

(2) The MPGF system shall be operated with a flame present at all times when in use. Each stage of MPGF burners must have at least two pilots with a continuously lit pilot flame. The pilot flame(s) must be continuously monitored by a thermocouple or any other equivalent device used to detect the presence of a flame. The time, date, and duration of any complete loss of pilot flame on any stage of MPGF burners must be recorded. Each monitoring device must be maintained or replaced at a frequency in accordance with the manufacturer's specifications.

(3) The MPGF system shall be operated with no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. A video camera that is capable of continuously recording (i.e., at least one frame every 15 seconds with time and date stamps) images of the flare flame and a reasonable distance above the flare flame at an angle suitable for visible emissions observations must be used to demonstrate compliance with this requirement. The owner or operator must provide real-time video surveillance camera output to the

control room or other continuously manned location where the video camera images may be viewed at any time.

(4) The operator of an MPGF system shall install and operate pressure monitor(s) on the main flare header, as well as a valve position indicator monitoring system for each staging valve to ensure that the MPGF operates within the range of tested conditions or within the range of the manufacturer's specifications. The pressure monitor shall meet the requirements in Table 2. Maintenance periods, instrument adjustments or checks to maintain precision and accuracy, and zero and span adjustments may not exceed 5 percent of the time the flare is receiving regulated material.

(5) Recordkeeping Requirements

(a) All data must be recorded and maintained for a minimum of 3 years or for as long as applicable rule subpart(s) specify flare records should be kept, whichever is more stringent.

(6) Reporting Requirements

(a) The information specified in Section III (6)(b) and (c) below should be reported in the timeline specified by the applicable rule subpart(s) for which the MPGF will control emissions.

(b) Owners or operators should include the following information in their initial Notification of Compliance status report:

(i) Specify flare design as a pressure-assisted MPGF.

(ii) All visible emission readings, NHV_{cz} and/or LFL_{cz} determinations, and flow rate measurements. For MPGF, exit velocity determinations do not need to be reported as the maximum permitted velocity requirements in the General Provisions at 40 CFR 60.18 and 40 CFR 63.11 are not applicable.

(iii) All periods during the compliance determination when a complete loss of pilot flame on any stage of MPGF burners occurs.

(iv) All periods during the compliance determination when the pressure monitor(s) on the main flare header show the MPGF burners operating outside the range of tested conditions or outside the range of the manufacturer's specifications.

(v) All periods during the compliance determination when the staging valve position indicator monitoring system indicates a stage of the MPGF should not be in operation and is or when a stage of the MPGF should be in operation and is not.

(c) The owner or operator shall notify the Administrator of periods of excess emissions in their Periodic Reports. These periods of excess emissions shall include:

(i) Records of each 15-minute block during which there was at least 1 minute when regulated material was routed to the MPGF and a complete loss of pilot flame on a stage of burners occurred.

(ii) Records of visible emissions events that are time and date stamped and exceed more than 5 minutes in any 2-hour consecutive period.

(iii) Records of each 15-minute block period for which an applicable combustion zone operating limit (i.e., NHV_{cz} or LFL_{cz}) is not met for the MPGF when regulated material is being combusted in the flare. Indicate the date and time for each period, the NHV_{cz} and/or LFL_{cz} operating parameter for the period and the type of monitoring system used to determine compliance with the operating parameters (e.g., gas chromatograph or calorimeter).

(iv) Records of when the pressure monitor(s) on the main flare header show the MPGF burners are operating outside the range of tested conditions or outside the range of the manufacturer’s specifications. Indicate the date and time for each period, the pressure measurement, the stage(s) and number of MPGF burners affected and the range of tested conditions or manufacturer’s specifications.

(v) Records of when the staging valve position indicator monitoring system indicates a stage of the MPGF should not be in operation and is or when a stage of the MPGF should be in operation and is not. Indicate the date and time for each period, whether the stage was supposed to be open, but was closed or vice versa, and the stage(s) and number of MPGF burners affected.

IV. Final Framework for Streamlining Approval of Future Pressure-Assisted MPGF AMEL Requests

We are finalizing a framework that sources may use to submit an AMEL request to the EPA in order to use an MPGF as control devices to comply with new source performance standards (NSPS) and national emission standards for hazardous air pollutants (NESHAP) under 40 CFR parts 60, 61, and 63. At a minimum, sources considering use of an MPGF as an emissions control technology should provide the EPA with the following information in its AMEL request when demonstrating MPGF equivalency:

(1) Project Scope and Background

(a) Size and scope of plant, products produced, location of facility, and the MPGF proximity, if less than 2 miles, to the local community and schools.

(b) Details of overall emissions control scheme (e.g., low pressure control scenario and high pressure control scenario), MPGF capacity and operation (including number of rows (stages), number of burners and pilots per stage and staging curve), and how the MPGF will be used (e.g., controls routine flows, only controls flows during periods of startup, shutdown, maintenance, emergencies).

(c) Details of typical and/or anticipated waste gas compositions and profiles to be routed to the MPGF for control.

(d) MPGF burner design including type, geometry, and size.

(e) Anticipated date of startup.

(2) Regulatory Applicability

(a) Detailed list or table of applicable NESHAP and/or NSPS, applicable standards that allow use of flares, and authority that allows the owner or operator to request an AMEL.

(3) Destruction Efficiency/Combustion Efficiency Performance Demonstration

(a) Sources must provide a performance demonstration to the Agency that the MPGF pressure-assisted burner being proposed for use will achieve a level of control at least equivalent to the most stringent level of control required by the underlying standards (e.g., 98-percent destruction efficiency or better). Facilities can elect to do a performance test that includes a

minimum of three test runs under the most challenging conditions (e.g., highest operating pressure and/or sonic velocity conditions) using passive Fourier transform infrared spectroscopy (PFTIR) testing, extractive sampling or rely on an engineering assessment. Sources must test using fuel representative of the type of waste gas the MPGF will typically burn or substitute a waste gas such as an olefin gas or olefinic gas mixture that will challenge the MPGF to achieve a high destruction efficiency smokelessly.

(i) If a performance test is conducted on the burners, a test report must be submitted to the Agency which includes at a minimum: A description of the testing, a protocol describing the test methodology used, associated test method quality assurance/quality control (QA/QC) parameters, raw field and laboratory data sheets, summary data report sheets, calibration standards, calibration curves, completed visible emissions observation forms, a calculation of the average destruction efficiency and combustion efficiency over the course of each test, the date, time and duration of the test, the waste gas composition and NHV_{cz} and/or LFL_{cz} the gas tested, the flowrate (at standard conditions) and velocity of the waste gas, the MPGF burner tip pressure, waste gas temperature, meteorological conditions (e.g., ambient temperature, barometric pressure, wind

speed and direction and relative humidity), and whether there were any observed flare flameouts.

(ii) If an engineering assessment is done, sources must provide to the Agency a demonstration that a proper level of destruction/combustion efficiency was obtained through prior performance testing for a similar equivalent burner type design. To support an equivalent burner assessment of destruction/combustion efficiency, sources must discuss and provide information related to design principles of burner type, burner size, burner geometry, air-fuel mixing, and the combustion principles associated with this burner that will assure smokeless operation under a variety of operating conditions. Similarly, sources must also provide details outlining why all of these factors, in concert with the waste gas that was tested in the supporting reference materials, support the conclusion that the MPGF burners being proposed for use by the source will achieve at least an equivalent level of destruction efficiency as required by the underlying applicable regulations.

(4) MPGF Stability Testing

(a) The operation of an MPGF with a stable, lit flame is of paramount importance to continuously ensuring good flare performance; therefore, any source wishing to demonstrate

equivalency for purposes of using these types of installations must conduct a stability performance test. Since flare tip design and waste gas composition have significant impact on the range of stable operation, sources should use a representative waste gas the MPGF will typically burn or a waste gas, such as an olefin or olefinic mixture, that will challenge the MPGF to perform at a high level with a stable flame as well as challenge its ability to achieve smokeless operation.

(b) Sources should first design and carry out a performance test to determine the point of flare flame instability and flameout for the MPGF burner and waste gas composition chosen to be tested. Successful, initial demonstration of stability is achieved when there is a stable, lit flame for a minimum of 5 minutes at consistent flow and waste gas composition. It is recommended, although not required, that sources determine the point of instability at sonic flow conditions or at the highest operating pressure anticipated. Any data which demonstrate instability and complete loss of flame prior to the 5-minute period must be reported along with the initial stable flame demonstration. Along with destruction efficiency and combustion efficiency, the data elements laid out in Section IV (3)(a)(i) above should also be reported.

(c) Using the results from Section IV (4)(b) above as a starting point, sources must perform a minimum of three replicate tests at both the minimum and maximum operating conditions on at least one MPGF burner at or above the NHV_{cz} or at or below the LFL_{cz} determined in Section IV (4)(b). If more than one burner is tested, the spacing between the burners must be representative of the projected installation. Each test must be a minimum of 5 minutes in duration with constant flow and composition for the three runs at minimum conditions, and the three runs at the maximum conditions. The data and data elements mentioned in Section IV (4)(b) must also be reported.

(5) MPGF Cross-light Testing

(a) Sources must design and carry out a performance test to successfully demonstrate that cross lighting of the MPGF burners will occur over the range of operating conditions (e.g., operating pressure and/or velocity (Mach) condition) for which the burners will be used. Sources may use the NHV_{cz} and/or LFL_{cz} established in Section IV (4) above and perform a minimum of three replicate runs at each of the operating conditions. Sources must cross-light a minimum of three burners and the spacing between the burners and location of the pilot flame must be representative of the projected installation. At a minimum, sources must report the following: A description of the testing,

a protocol describing the test methodology used, associated test method QA/QC parameters, the waste gas composition and NHV_{cz} and/or LFL_{cz} of the gas tested, the velocity (or Mach speed ratio) of the waste gas tested, the MPGF burner tip pressure, the time, length, and duration of the test, records of whether a successful cross-light was observed over all of the burners and the length of time it took for the burners to cross-light, records of maintaining a stable flame after a successful cross-light and the duration for which this was observed, records of any smoking events during the cross-light, waste gas temperature, meteorological conditions (e.g., ambient temperature, barometric pressure, wind speed and direction, and relative humidity), and whether there were any observed flare flameouts.

(6) Flaring Reduction Considerations

(a) Sources must make a demonstration, considering MPGF use, on whether additional flare reduction measures, including flare gas recovery, should be used and implemented.

(7) MPGF Monitoring and Operating Conditions

(a) Based on the results of the criteria mentioned above in this section, sources must make recommendations to the Agency on the type of monitoring and operating conditions necessary for the MPGF to demonstrate equivalent reductions in emissions as

compared to flares complying with the requirements at 40 CFR 60.18 and 40 CFR 63.11, taking into consideration a control scheme designed to handle highly variable flows and waste gas compositions.

We anticipate this framework will enable the Agency to review and approve future AMEL requests for MPGF installations in a more expeditious timeframe. We note, however, that future AMEL requests are still subject to public notice and comment.

Dated: April 11, 2016.

Janet G. McCabe,

Acting Assistant Administrator.

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